

## Tracking and Data Relay Satellite: Four Decades of Launches



**TDRS-A/TDRS 1**  
April 4, 1983



**TDRS-C/TDRS 3**  
September 29, 1988



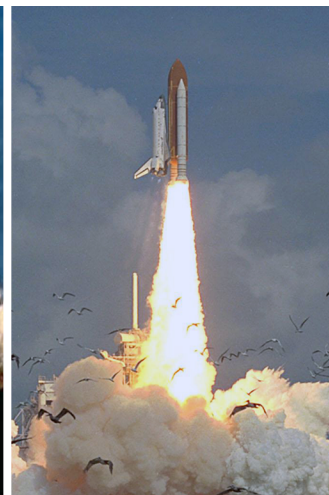
**TDRS-D/TDRS 4**  
March 13, 1989



**TDRS-E/TDRS 5**  
August 2, 1991



**TDRS-F/TDRS 6**  
January 13, 1993



**TDRS-G/TDRS 7**  
July 13, 1995



**TDRS-H/TDRS 8**  
June 30, 2000



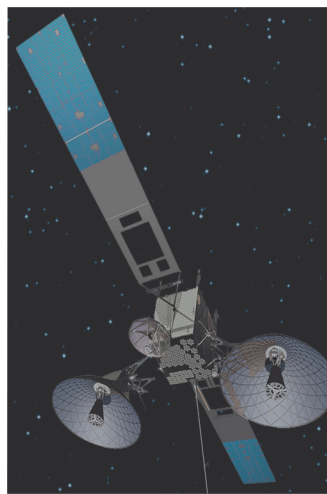
**TDRS-I/TDRS 9**  
March 8, 2002



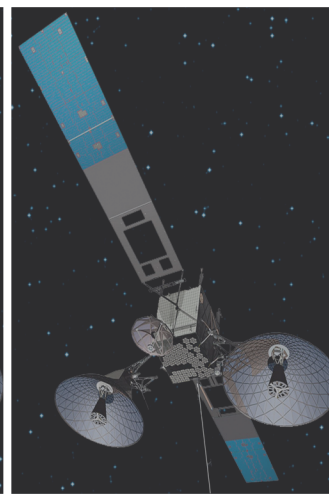
**TDRS-J/TDRS 10**  
December 4, 2002



**TDRS-K/TDRS 11**  
January 30, 2013



**TDRS-L/TDRS 12**  
Coming 2014



**TDRS-M/TDRS 13**  
Coming 2015





## Launch History:

The concept behind NASA's Tracking and Data Relay Satellite (TDRS) was born out of NASA's effort to rely less heavily on international ground stations, and create long-duration and highly available communication coverage.

Established in 1973, the prime design goal of the TDRS Project was to provide continuous, around-the-clock communications services to NASA's most critical low Earth-orbiting missions. Launches of TDRS spacecraft began in the 1980s and have continued through the new millennium. Most of these satellites are still operational today (with a number of them operating beyond their design life). Today, the TDRS Project is in the midst of launching the third generation of Tracking and Data Relay Satellites (TDRS K, L, and M).

Since its inception, there have been 11 TDRS satellites launched by NASA. TRW, now known as Northrop Grumman in Redondo Beach, CA, built the first six satellites as a subcontractor to the Space Communications Company in the 1980s and early 1990s. Originally, only six TDRS satellites were ordered. However, TDRS 7 was ordered as a sole source from TRW as a replacement after TDRS 2 was lost aboard the Space Shuttle Challenger in 1986. TDRS H, I, and J (known as the second generation TDRS) were built by Hughes (now Boeing) in El Segundo, CA in the late 1990s and early 2000s.

The contract to develop the third generation TDRS

was awarded to Boeing in December of 2007. The primary difference between the second generation and the third generation is the shift from on-orbit beamforming of the S-band Multiple Access Return services to ground based beamforming (GBBF) (a return to the first generation architecture). TDRS K launched January 30, 2013, TDRS L is scheduled

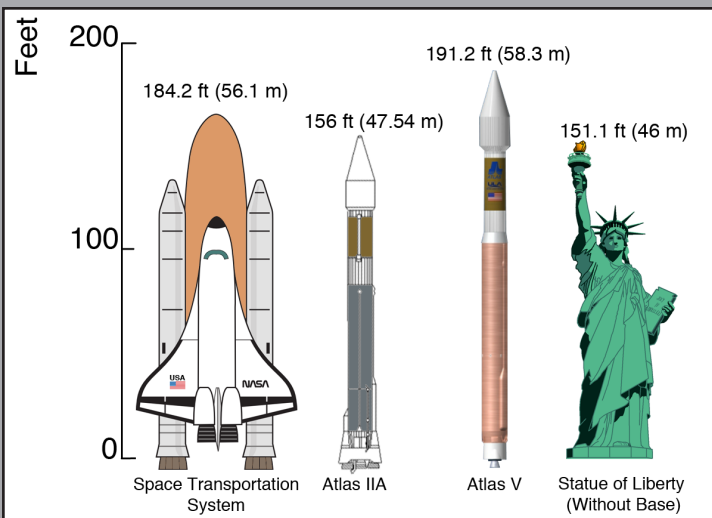
for launch in 2014, and TDRS M in 2015.

The TDRS Project provides the follow-on spacecraft necessary to maintain and expand the Space Network. This program also includes modifications to the White Sands Complex (WSC) ground segment required to support these spacecraft.

## Launch Vehicles:

The first generation of TDRS satellites (A,B,C,D,E,F,G) launched into space aboard Space Transportation System (STS) vehicles, more commonly known as the Space Shuttle Program. The Space Shuttle Program was made up of manned, partially reusable low Earth orbital spacecraft. The first generation of TDRS spacecraft were launched using Space Shuttles from 1983 -1995.

The second generation of TDRS Satellites (H,I,J) was launched aboard Atlas IIA Launch Vehicles from 2000-2002. Atlas IIA Vehicles were unmanned launch vehicles used to propel spacecraft into low Earth and geosynchronous orbits. The second generation of TDRS spacecraft were launched aboard these vehicles from 2000-2002.



The third generation of Tracking and Data Relay Satellites (K,L,M) will be launched aboard an Atlas V launch vehicle, produced and built by Lockheed Martin. In planning TDRS K, L, and M requirements were sent to the United Launch Alliance (ULA) to identify the best Expendable Launch Vehicle to launch TDRS into its geosynchronous orbit. In 2009, the Lockheed Martin Atlas V was chosen. TDRS-K launched in 2013, and TDRS-L and M are expected to launch in 2014 and 2015 respectively.